DOWNHOLE VIBRATION MONITORING & CONTROL SYSTEM
QUARTERLY PROGRESS REPORT #11

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ABSTRACT

The objective of this program is to develop a system to both monitor the vibration of a bottomhole assembly, and to adjust the properties of an active damper in response to these measured vibrations. Phase I of this program, which entailed modeling and design of the necessary subsystems and design, manufacture and test of a full laboratory prototype, was completed on May 31, 2004.

The principal objectives of Phase II are: more extensive laboratory testing, including the evaluation of different feedback algorithms for control of the damper; design and manufacture of a field prototype system; and, testing of the field prototype in drilling laboratories and test wells.

Work during this quarter centered on the rebuilding of the prototype using the improved valve design described in the last report[1]. Most of the components have been received and assembly has begun. Testing is expected to resume in August.

In April, a paper was presented at the American Association of Drilling Engineers National Technical Conference in Houston[2]. [Copy attached to last quarter's report.[1]] The paper was well received, and several oilfield service and supply companies sent inquiries regarding commercial distribution of the system. These are currently being pursued, but none have yet been finalized

The project is approximately five months behind schedule at this time.

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Executive Summary

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Design

Redesign of laboratory prototype

Complete. The redesign valve now has the coils located in the non-reciprocating portion of the tool. This lends itself to a more reliable electrical connection and better protection of the coils from the abrasive MR fluid.

Design of feedback system

The algorithms are installed in the system.

Field prototype design

The redesign was completed last quarter.

Experimental

Retesting of DVMCS prototype

Assembly of the revised prototype began in this quarter, after some delays in having the parts machined. The coils have been wound and the MR valve is being assembled.

Analysis

No further analysis was performed during this quarter.

Other

A paper on this project was presented to the American Association of Drilling Engineers National Technology Conference. A copy was attached to the previous quarterly report. The paper was enthusiastically received, and generated several commercial inquiries. These are being pursued.

Units

To be consistent with standard oilfield practice, English units have been used in this report. The conversion factors into SI units are given below.

1 ft.	=	0.30480 m
1 g	=	9.82 m/s
1 in.	=	0.02540 m
1 klb.	=	4448.2 N
1 lb.	=	4.4482 N
1 rpm	=	0.01667 Hz
1 psi	=	6984.76 Pa

References

[1] APS Technology, Inc., "Downhole Vibration Monitoring & Control System Quarterly Progress Report #10," DE-FC26-02NT41664, 27 April, 2005.

[2] M.E. Cobern & Mark E. Wassell, "Laboratory Testing of an Active Drilling Vibration Monitoring and Control System," presented at the AADE National Technical Conference and Exhibition, Houston, 5-7 April, 2005, Paper AADE-05-NTCE-25.